**What is claimed is:**

1. A device for adsorbing water vapor from a gas stream, comprising:

(a) a gas stream inlet;

(b) a gas stream outlet;

(c) at least a first flow channel disposed between said inlet and said outlet;

(d) a desiccant in vapor communication with said first flow channel;

(e) a phase-change material in thermal communication with said desiccant; and

(f) means for moving a gas stream from said inlet to said outlet.

2. A device as recited in Claim 1, wherein said device comprises a plurality of said flow channels.

3. A device as recited in Claim 1, wherein said desiccant is disposed within said flow channel.

4. A device as recited in Claim 1, wherein said desiccant comprises a rigid structure defining as least a first wall of said flow channel.

5. A device as recited in Claim 1, wherein said desiccant includes a material selected from the group consisting of zeolites, barium oxide, magnesium perchlorate, calcium sulfate, calcium oxide, activated carbon, modified carbon, calcium chloride, glycerin, silica gel, alumina gel, calcium hydride, phosphoric anhydride, phosphoric acid, potassium hydroxide, sodium sulfate and combinations thereof.

6. A device as recited in Claim 1, wherein said desiccant comprises a porous support structure having a metal salt impregnated onto said porous support.

7. A device as recited in Claim 6, wherein said metal salt is selected from the group consisting of calcium chloride, lithium chloride, lithium bromide, magnesium chloride, calcium nitrate, potassium fluoride and combinations thereof.

8. A device as recited in Claim 1, wherein said phase change material has a transition temperature of from about 10°C and 80°C.

9. A device as recited in Claim 1, wherein said phase change material has a volumetric energy density of at least about 200 J/cm$^3$.

10. A device as recited in Claim 1, wherein said phase change material is selected from the group consisting of sodium sulfate decahydrate, disodium hypophosphate dodecahydrate, barium hydroxide octahydrate, paraffins and combinations thereof.

11. A device as recited in Claim 1, further comprising a fluid diffusion barrier disposed between said desiccant and said phase change material.

12. A device as recited in Claim 11, wherein said fluid diffusion barrier is selected from the group consisting of polyethylene, nylon, PVC, metal foils, metallized plastic barriers, multi-layer plastics and combinations thereof.

13. A device as recited in Claim 1, wherein said cooling device is substantially encapsulated by a water impermeable envelope before activation thereof.

14. A device as recited in Claim 13, wherein said water impermeable envelope is selected from the group consisting of polyethylene, nylon, PVC, metal foils, metallized plastic barriers, multi-layer plastic and combinations thereof.

15. A device as recited in Claim 1, wherein said means for moving a gas stream comprises a fan.

16. A device as recited in Claim 1, wherein said device is disposed in the interior of a sealed enclosure.

17. A climate-controlled enclosure, comprising:

(a) at least a first wall member defining anenclosed space;

(b) a water extraction device in fluid communication with said enclosed space, said cooling device comprising:

(i) a device inlet;

(ii) a device outlet in fluid communication with saidenclosed space;

(iii) at least a first flow channel disposed between said cooling device inlet and said device outlet;

(iv) a desiccant in vapor communication with said first flow channel; and

(v) a phase-change material in thermal communication with said desiccant;

whereby said device is adapted to extract water vapor from a gas stream and provide a dried gas stream to said enclosed space.

18. A climate-controlled enclosure as recited in Claim 17, wherein said enclosure is a tent.

19. A climate-controlled enclosure as recited in Claim 17, wherein said enclosure is a hazardous materials suit.

20. A climate-controlled enclosure as recited in Claim 17, wherein said first wall member comprises an enclosure outlet and wherein said enclosure outlet is in fluid communication with said device inlet.

21. A climate-controlled enclosure as recited in Claim 17, wherein said device inlet is in fluid communication with ambient air during operation of said device.

22. A climate-controlled enclosure as recited in Claim 17, wherein said cooling device is disposed within said enclosed space.

23. A climate-controlled enclosure as recited in Claim 17, wherein said desiccant is selected from the group consisting of zeolites, barium oxide, magnesium perchlorate, calcium sulfate, calcium oxide, activated carbon, modified carbon, calcium chloride, glycerin, silica gel, alumina gel, calcium hydride, phosphoric anhydride, phosphoric acid, potassium hydroxide, sodium sulfate, and combinations thereof.

24. A climate-controlled enclosure as recited in Claim 17, wherein said desiccant comprises a metal salt dispersed on a porous support.

25. A device as recited in Claim 24, wherein said metal salt is selected from the group consisting of calcium chloride, llithium chloride, lithium bromide, magnesium chloride, calcium nitrate, potassium fluoride and combinations thereof.

26. A climate-controlled enclosure as recited in Claim 17, wherein said phase change material has a transition temperature of from about 10°C and 80°C.

27. A climate-controlled enclosure as recited in Claim 17, wherein said phase change material has a volumetric energy density of at least about 200 $J/cm^3$.

28. A climate-controlled enclosure as recited in Claim 17, wherein said phase change material is selected from the group consisting of sodium sulfate decahydrate, disodium hypophosphate dodecahydrate, barium hydroxide octahydrate, paraffins and combinations thereof.

29. A climate-controlled enclosure as recited in Claim 17, further comprising a fluid diffusion barrier disposed between said desiccant and said phase change material.

30. A climate-controlled enclosure as recited in Claim 17, wherein said device is substantially encapsulated by a water impermeable envelope before activation thereof.

31. A climate-controlled enclosure as recited in Claim 17, wherein said device is substantially encapsulated by a thermally insulative material.

32. A climate-controlled enclosure as recited in Claim 17, further comprising a fan adapted to move a gas stream through said first flow channel.

33. A personal cooling device, comprising:

(a) a garment adapted to be worn by a user and comprising a garment inlet adapted to receive a gas stream flow and pass the gas stream flow to an interior of said garment when worn by a user; and

(b) a cooling device in fluid communication with said garment inlet and adapted to provide a gas stream flow to said inlet, said cooling device comprising:

(i) a cooling device inlet;

(ii) a cooling device outlet adapted to provide a gas stream to said garment interior;

(iii) at least a first flow channel disposed between said cooling device inlet and said cooling device outlet;

(iv) a desiccant in vapor communication with said first flow channel; and

(v) a phase-change material in thermal communication with said desiccant.

34. A personal cooling device as recited in Claim 33, wherein said garment further comprises a garment outlet in fluid communication with said cooling device inlet.

35. A personal cooling device as recited in Claim 34, wherein said garment defines a sealed enclosure for providing a microclimate to a user.

36. A personal cooling device as recited in Claim 35, wherein said garment is a hazardous materials suit.

37. A personal cooling device as recited in Claim 33, wherein said cooling device inlet is in fluid communication with ambient air during operation of said cooling device.

38. A personal cooling device as recited in Claim 33, wherein said desiccant is selected from the group consisting of zeolites, barium oxide, magnesium perchlorate, calcium sulfate, calcium oxide, activated carbon, calcium chloride, glycerine silica gel, alumina gel, calcium hydride, phosphoric anhydride, phosphoric acid, potassium hydroxide, sodium sulfate, activated carbon, modified carbons and combinations thereof.

39. A device as recited in Claim 38, wherein said desiccant comprises a porous support structure having a metal salt impregnated onto said porous support.

40. A device as recited in Claim 39, wherein said metal salt is selected from the group consisting of calcium chloride, llithium chloride, lithium bromide, magnesium chloride, calcium nitrate, potassium fluoride and combinations thereof.

41. A personal cooling device as recited in Claim 33, wherein said phase-change material has a transition temperature of from about 10°C to about 80°C.

42. A personal cooling device as recited in Claim 33, wherein said phase-change material has a volumetric energy density of at least about 200 $J/cm^3$.

43. A personal cooling device as recited in Claim 33, wherein said phase-change material is selected from the group consisting of sodium sulfate decahydrate, disodium hypophosphate dodecahydrate, barium hydroxide octahydrate, paraffins and combinations thereof.

44. A personal cooling device as recited in Claim 33, wherein said cooling device further comprises a fluid diffusion barrier disposed between said desiccant and said phase-change material.

45. A personal cooling device as recited in Claim 33, wherein the ratio of mass of desiccant to mass of phase-change material is not greater than about 0.10.

46. A personal cooling device as recited in Claim 33, wherein the cooling device is substantially encapsulated by a water impermeable casing prior to activation thereof.

47. A personal cooling device as recited in Claim 33, wherein said cooling device is substantially encapsulated by a thermal insulation material.

48. A personal cooling device as recited in Claim 47, wherein said thermal insulation material is selected from the group consisting of polymer foams, fiberglass, open-cell foam, vacuum insulation and combinations thereof.

49. A personal cooling device as recited in Claim 33, wherein said cooling device further comprises a fan adapted to move a gas stream through said first flow channel.